FIG. 1. Rat polypeptide P501S sequence (SEQ ID NO.1)

MIQRLWASRLLRHRKAQLLLVNLLTFGLEVCLAAGITYVPPLLLEVGVEEKFMTMVLGIGPVLGLVSVP
LLGSASDQWRGRYGRRRPFIWALSLGVLLSLFLIPRAGWLAGLLCSDTRPLELALLILGVGLLDFCGQV
CFTPLEALLSDLFRDPDHCRQAFSVYAFMISLGGCLGYLLPAIDWDTSALAPYLGTQEECLFGLLTLIF
LICVAATLLVAEEAVLGPPEPAEGLLVSSVSRRCCSCHAGLAFRNLGTLFPRLHQLCCRMPRTLRRLFV
AELCSWMALMTFTLFYTDFVGEGLYQGVPRAEPGTEARRHYDEGIRMGSLGLFLQCAISLFFSLVMDRL
VQKFGTRSVYLASVMTFPVAAAATCLSHSVVVVTASAALTGFTFSALQILPYTLASLYHREKQVFLPKY
RGDAGGGSSEDSQTTSFLLGPKPGAPFPNGHVGPGGSSILVPPPALCGASACDVSMRVVVGEPPEAKVV
TGRGICLDLAILDSAFLLSQVAPSLFMGSIVQLSHSVTAYMVSAAGLGLVAIYFATQVVFDKNDLAKYS
L

FIG.2. Nucleotide sequence encoding rat P501S (SEQ ID NO.2).

GGGCTCTTAGACACCGCAACAAAAGCAACTTTCCTCCAAGCCACTGCCACCTGTTGGGTTTTCACACAT
TTCGAGCTTTAGTTCCGATCCCCAGAACATCCACGTAGTTTTTCTGGCCTTCTGGCTGAGCCATGGAGG
CCGACAGAGGAGGGGAGAAGTTTGAAGCTTGAGAAGGATTTCCGTATGCGCAAGGCTACCCATGCTTGT
CCTTCCTCCCATGACCCTGGTCAGCCCTCCTCTGCCCTCCTCTTCCTGCCCCCCTTCTCTCCAGGGTCC
GACTGACGAGATGTGTCCCCATCAAGCAAGGCACTAGATGGTGACGTGTTCAGTGTGGGATGAGATGCC
GAAGTGGTACTCAAGGGCTGGCCGAAATGGGAGCCTGGCTGCACCCTCGGAGGTTGGTGCTAGCAAGGA
GGAGAAGCCGCGGCAGGGCTGACTCAAAACAGCTGTGGGGTGTGTGAATGGCCCCCGGACCCCTAACCG
CCCTGTCCATCatgatccagaggctgtgggccagccgtctgctaaggcatcggaaagcccagctcctgc
tggtcaacctgctaaccttcggcctggaggtgtgcctggctgctggcattacctatgtgccacccccttc
tgctggaagtcggggtagaggaaaagttcatgaccatggtgttgggcattggcccagtgctgggcctgg
tttctgttccactcctaggctcagccagtgaccagtggcgtgggcgctatggccgccggagacccttta
tctgggctctgtccctgggtgtcctgctaagcctcttcctcatcccgagggccggctggctggcagggc
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gcggccaggtgtgctttactccactggaggccttactctccgacctcttccgggacccagaccactgcc
gccaagccttctctgtctatgccttcatgatcagcctcgggggctgcctgggctacctcttacctgcca
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aaggcattcgaatgggcagcctggggctcttcctgcagtgtgccatctccctgttcttctccctggtca
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ctgccgctgccacgtgcctgtcccacagcgtggttgtagtgacagcctcagctgccctcaccgggttca

ccttctcagccttgcagatcctgccttacacgctcgcctccctctaccatcgagagaagcaggtgttcc
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gccctaagccaggagctcccttccccaatggacacgtgggccctggcggcagcagcatcctggtgcccc
cacctgcactctgtggggcctctgcctgtgatgtctccatgcgagtggtagtgggtgagccacctgaag
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cagctgcaggcttgggtctggtcgccatttactttgctacacaggtagtgtttgacaagaatgacttgg
ccaaatactcactgtagAATTCTGTAAGGCATCAAAGAAGAGGATCTGCCTCCCCGGTTCTCAGCCCCA
GAGGGCTGCAGAGCTGGTCTCTTTCCGGTCTCTGTTGCCCTGAGTGGCTCTCCACTGCCATCCGAAGGC
AGTGAGGTGTATGGCTGCACAGGTTGGAGCTTTTGGC

FIG. 3. Amino acid sequence for Cynomolgus monkey P501S (SEQ ID N°3)

MVQRLWVSRLLRHRKAQLLLINLLTFGLEVCLAAGITYVPPLLLEVGVEEKFMTMVLGIGPVLGLVSVP
LLGSASDHWRGRYGRRRPFIWALSLGILLSLFLIPRAGWLAGLLCPDPRPLELALLILGVGLLDFCGQV
CFTPLEALLSDLFRDPDHCRQAYSVYAFMISLGGCLGYLLPAIDWDTSALAPYLGTQEECLFGLLTLIF
LTCVAATLLVAEEAALGPAEPAEGLSAPSLPSHCCPCWARLAFRNLGALLPRLHQLCCRMPRTLRRLFV
AELCSWMALMTFTLFYTDFVGEGLYQGVPRAELGTEARRHYDEGVRMGSLGLFLQCAISLVFSLVMDRL
VQRFGTRAVYLASVAAFPVAAGATCLSHSVAVVTASAALTGFTFSALQILPYTLASLYHRERQVFLPKY
RGDAGGTSSEDSLMTSFLPGPKPGAPFPNGHVGAGGSGLLPPPPALCGASACDVSVRVVVGEPTEARVV
PGRGICLDLAILDSAFLLSQVAPSLFMGSIVQLSQSVTAYMVSAAGLGLVAIYFATQVVFDKSDLAKYS
V

FIG.4. Nucleotide sequence for Cynomolgus monkey P501S (SEQ ID N°3)

AAAAAAAAAGCCGCCGGCTGGCGCGCGTGGGGGGCAAGGAAAAGAGGGGGGAAACCAGTCTGCACGCGC
TGGCTCCGGGTGACAGCCGCGCGCCTAGGCCAGGCAGCGTCTCCCTCTGTCACCCAGACTGGAGGCAAT
GTTCTGATCACTGCACACTGCACCCTTGACCTCCCAGACTCAAGCAATCCTCCCATCTCAGCCTCTTAA
GTAGCTGGGACCACAGGATCTGAGTGATGAGATGTGTCCCCACTGAGGTGCCCCACAGCAGCAGGTGTT
GAGCATGGGCTGAGAAGCTGGACCGGCACCAAAGGGCTGGCGGAAATGGGCGCCTGGCTGATTCCTAGG
CAGTTGGCGGCAGCAAGGAGGAGAGGCCGTGGCTTCCGGAGCAGAGCGGAGACGAAGCAGTTCTGGAGT
GCTTAAACGGCCCCCTGAGCCCTACCCGCCTGGCCCACTatggtccagaggctgtgggtgagccgcctg
ctgcggcaccggaaagcccagctcttgttgatcaacctgctaacctttggcctggaagtgtgtttggcc
gcaggcatcacctatgtgccgcctctgctgctggaagtgggggtagaagagaagttcatgaccatggtg
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ggacgctatggccgccggcggcccttcatctgggcgctgtccttgggcatcctgctgagcctctttctc
atcccaagggctggctggctggcagggctgctgtgcccggatcccaggcccctggagctggcactgctc
atcctgggcgtagggctgctggacttctgtggccaggtgtgcttcactccactggaggccctgctctct
gacctgttccgggacccggaccactgtcgccaggcctactccgtctatgccttcatgatcagtcttggg

ggctgcctgggctacctcctgcctgccattgactgggacaccagtgccctggccccctacctgggcacc
caggaggagtgcctctttggcctgctcaccctcatcttcctcacctgcgtagcagccacactgctggtg
gccgaggaggcagcactgggccccgccgagccagcggaagggctgtctgccccctccctgccgtcccac
tgctgtccgtgctgggcccgcctggctttccggaacctgggcgccctgcttccccggctgcaccagctg
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agccagtctgtcactgcctatatggtgtctgctgcaggcctgggtctggttgccatttactttgctaca
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AGGGCCTGCCTCACTGGGTCCCAGCTCCCCACTCTTTGTTAGCCCCATGGGGCTGCTGGGCTGGCCGCC
AGTTTCTGTTGCTGCCAAAGTAATGTGGCTCTCTGCTGCCACCCTGTGCTGCTGAGGTGCGTAGCTGCA
CAGCTGGGGGCTGGGGCATCCCTCTCCCTCCTCCCCAGTCTCTAGGGCTGCCTGACTGGAAGCCTTCCA
AGGGGGTTTCAGTCTGGACTTCTACAGGGAGGCTAGAAGGGCAGGGCATTTGATTCGCTCCATGCACTG
GAATGTGGGGACTCTGCAGGTGGATTACCCAGGCTCAGGGTTAACAGCTAGCCTCCTGGCTGAGACATA
CCTAGAGAAGGGGTTTTGGGAGCTGAGTAAACTCAGTCACCTGGTTTCCCACCTCTAAGCCCCCTTAAC
CTGCAGCTTCATTTAATGTAGCTCTTGCATGGGAGTTTCTAGGATGAAACACTCCTCCGTGGGATTTGA
ACGTATGAAAGTTATTTGTAGGGGAAGAGTCCTGAGGGGCAACACACCAGGTCCCCTCAGCCCACAGCA
CTGCCTTTTTGCTGATCCCCTGACTCTTACCTTTTATCAGGACGTGGCCTATTGGTCCCTTTGTTGCCA
TCATAGGGACACAGGCATTTAAATATTTAACTTATTTATTTAACAAAGTAGAAGGGAATCCATTGCTAG
CTTTTGTGTGTTGGTGTCTAAGATTTGGGTAGGGTGGGATCCCCAACAATCAGGTCCACTGAGATCACT
GGTCATTGGGCTGATCATTGCCAGAATCTTCTTCTCCTGGGGTCTGGCTCCTCAAAATGCCTAACCCAG
GACCTTGGAAATTTTACTCATCCCGACTGATAATTCCAAATGCTGTTACCCAAGGTTAGGGGGTTGAAG
GAAGGTGGAGGGTGGGGCTTCAGGTCTCAACAGCTTCCCTAACCACCCCTTTTCTCTTGGCCCAGCCTG
GTTCCCCCCACTTCTACTCCCCTCTACTGTCTCTAGGACTGGGCTGATGAAGGCACTGCCTGAAATTTC
CCTCACCCCCAACTTTCCCCACTGGCTCCACAACCCTGTTTGGAGCTGTTGCAGGACCAGAAGCACAAA
GTGTGGTTTCCCAGGCCTTTGTCCATCTCAGCCCCCCAGAGTATATCTGTGCTTGGGGAATCTCACACA
GAAACTCAGGAGCACCCCCTGCCTGAGCTAAGGAGGTCTTATCTCTCAGGGGGGTTTAAGTGCCGTTTG
CAATAATGTCTTATTTATTTAGCGGGGCAAATATTTTATACTGTAAGTGAGCAATCAGTATAATGTTTA
TGGTGATGAAATTAAAGGCTTTCTTATATGTTTAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

FIG.5. Amino acid sequence for human P501S (SEQ ID N°5)

MVQRLWVSRLLLRHRKAQLLLVNLLTFGLEVCLAAGITYVPPLLLEVGVEEKFMTMVLGIGPVLGLVCVP
LLGSASDHWRGRYGRRRPFIWALSLGILLSLFLIPRAGWLAGLLCPDPRPLELALLILGVGLLDFCGQV
CFTPLEALLSDLFRDPDHCRQAYSVYAFMISLGGCLGYLLPAIDWDTSALAPYLGTQEECLFGLLTLIF
LTCVAATLLVAEEAALGPTEPAEGLSAPSLSPHCCPCRARLAFRNLGALLPRLHQLCCRMPRTLRRLFV
AELCSWMALMTFTLFYTDFVGEGLYQGVPRAEPGTEARRHYDEGVRMGSLGLFLQCAISLVFSLVMDRL
VQRFGTRAVYLASVAAFPVAAGATCLSHSVAVVTASAALTGFTFSALQILPYTLASLYHREKQVFLPKY
RGDTGGASSEDSLMTSFLPGPKPGAPFPNGHVGAGGSGLLPPPPALCGASACDVSVRVVVGEPTEARVV
PGRGICLDLAILDSAFLLSQVAPSLFMGSIVQLSQSVTAYMVSAAGLGLVAIYFATQVVFDKSDLAKYS
A

FIG.6. Amino acid sequence for human P501S (SEQ ID N°6)

GLYQGVPRAEPGTEARRHYDEGVRMGSLGLFLQCAISLVFSLVMDRLVQRFGTRAVYLASVAAFPVAAG
ATCLSHSVAVVTASAALTGFTFSALQILPYTLASLYHREKQVFLPKYRGDTGGASSEDSLMTSFLPGPK
PGAPFPNGHVGAGGSGLLPPPPALCGASACDVSVRVVVGEPTEARVVPGRGICLDLAILDSAFLLSQVA
PSLFMGSIVQLSQSVTAYMVSAAGLGLVAIYFATQVVFDKSDLAKYSA

FIG.7. Amino acid sequence for human P501S (SEQ ID N°7)

MGSLGLFLQCAISLVFSLVMDRLVQRFGTRAVYLASVAAFPVAAGATCLSHSVAVVTASAALTGFTFSA
LQILPYTLASLYHREKQVFLPKYRGDTGGASSEDSLMTSFLPGPKPGAPFPNGHVGAGGSGLLPPPPAL
CGASACDVSVRVVVGEPTEARVVPGRGICLDLAILDSAFLLSQVAPSLFMGSIVQLSQSVTAYMVSAAA
LGLVAIYFATQVVFDKSDLAKYSA

FIG. 8: Design of the yeast P501S recombinant protein

FIG. 9. Amino acid sequence (SEQ ID NO:9) and nucleotide sequences (SEQ ID NO:8) of alpha prepro P501S his

Nucleotide sequence (SEQ ID NO:8)

ATGAGTTTCC TCAATTTTAC TGCAGTTTTA TTCGCAGCAT CCTCCGCATT AGCTGCTCCA
GTCAACACTA CAACAGAAGA TGAAACGGCA CAAATTCCGG CTGAAGCTGT CATCGGTTAC
TCAGATTTAG AAGGGGATTT CGATGTTGCT GTTTTGCCAT TTTCCAACAG CACAAATAAC
GGGTTATTGT TTATAAATAC TACTATTGCC AGCATTGCTG CTAAAGAAGA AGGGGTATCT
CTCGAGAAAA GAGAGGCTGA AGCCatgGTG CTGGGCATTG GTCCAGTGCT GGGCCTGGTC
TGTGTCCCGC TCCTAGGCTC AGCCAGTGAC CACTGGCGTG GACGCTATGG CCGCCGCCGG
CCCTTCATCT GGGCACTGTC CTTGGGCATC CTGCTGAGCC TCTTTCTCAT CCCAAGGGCC
GGCTGGCTAG CAGGGCTGCT GTGCCCGGAT CCCAGGCCCC TGGAGCTGGC ACTGCTCATC
CTGGGCGTGG GGCTGCTGGA CTTCTGTGGC CAGGTGTGCT TCACTCCACT GGAGGCCCTG
CTCTCTGACC TCTTCCGGGA CCCGGACCAC TGTCGCCAGG CCTACTCTGT CTATGCCTTC
ATGATCAGTC TTGGGGGCTG CCTGGGCTAC CTCCTGCCTG CCATTGACTG GGACACCAGT
GCCCTGGCCC CCTACCTGGG CACCCAGGAG GAGTGCCTCT TTGGCCTGCT CACCCTCATC
TTCCTCACCT GCGTAGCAGC CACACTGCTG GTGGCTGAGG AGGCAGCGCT GGGCCCCACC
GAGCCAGCAG AAGGGCTGTC GGCCCCCTCC TTGTCGCCCC ACTGCTGTCC ATGCCGGGCC
CGCTTGGCTT TCCGGAACCT GGGCGCCCTG CTTCCCCGGC TGCACCAGCT GTGCTGCCGC
ATGCCCCGCA CCCTGCGCCG GCTCTTCGTG GCTGAGCTGT GCAGCTGGAT GGCACTCATG
ACCTTCACGC TGTTTTACAC GGATTTCGTG GGCGAGGGGC TGTACCAGGG CGTGCCCAGA
GCTGAGCCGG GCACCGAGGC CCGGAGACAC TATGATGAAG GCGTTCGGAT GGGCAGCCTG
GGGCTGTTCC TGCAGTGCGC CATCTCCCTG GTCTTCTCTC TGGTCATGGA CCGGCTGGTG
CAGCGATTCG GCACTCGAGC AGTCTATTTG GCCAGTGTGG CAGCTTTCCC TGTGGCTGCC
GGTGCCACAT GCCTGTCCCA CAGTGTGGCC GTGGTGACAG CTTCAGCCGC CCTCACCGGG
TTCACCTTCT CAGCCCTGCA GATCCTGCCC TACACACTGG CCTCCCTCTA CCACCGGGAG
AAGCAGGTGT TCCTGCCCAA ATACCGAGGG GACACTGGAG GTGCTAGCAG TGAGGACAGC
CTGATGACCA GCTTCCTGCC AGGCCCTAAG CCTGGAGCTC CCTTCCCTAA TGGACACGTG
GGTGCTGGAG GCAGTGGCCT GCTCCCACCT CCACCCGCGC TCTGCGGGGC CTCTGCCTGT
GAtGTCTCCG TACGTGTGGT GGTGGGTGAG CCCACCGAGG CCAGGGTGGT TCCGGGCCGG
GGCATCTGCC TGGACCTCGC CATCCTGGAT AGTGCCTTCC TGCTGTCCCA GGTGGCCCCA
TCCCTGTTTA TGGGCTCCAT TGTCCAGCTC AGCCAGTCTG TCACTGCCTA TATGGTGTCT
GCCGCAGGCC TGGGTCTGGT CGCCATTTAC TTTGCTACAC AGGTAGTATT TGACAAGAGC
GACTTGGCCA AATACTCAGC Gggtggacac catcaccatc accattaa

Amino acid sequence (SEQ ID NO:9)

MSFLNFTAVL FAASSALAAP VNTTTEDETA QIPAEAVIGY SDLEGDFDVA VLPFSNSTNN
GLLFINTTIA SIAAKEEGVS LEKREAEAMV LGIGPVLGLV CVPLLGSASD HWRGRYGRRR
PFIWALSLGI LLSLFLIPRA GWLAGLLCPD PRPLELALLI LGVGLLDFCG QVCFTPLEAL
LSDLFRDPDH CRQAYSVYAF MISLGGCLGY LLPAIDWDTS ALAPYLGTQE ECLFGLLTLI

FLTCVAATLL VAEEAALGPT EPAEGLSAPS LSPHCCPCRA RLAFRNLGAL LPRLHQLCCR
MPRTLRRLFV AELCSWMALM TFTLFYTDFV GEGLYQGVPR AEPGTEARRH YDEGVRMGSL
GLFLQCAISL VFSLVMDRLV QRFGTRAVYL ASVAAFPVAA GATCLSHSVA VVTASAALTG
FTFSALQILP YTLASLYHRE KQVFLPKYRG DTGGASSEDS LMTSFLPGPK PGAPFPNGHV
GAGGSGLLPP PPALCGASAC DVSVRVVVGE PTEARVVPGR GICLDLAILD SAFLLSQVAP
SLFMGSIVQL SQSVTAYMVS AAGLGLVAIY FATQVVFDKS DLAKYSAGGH HHHHH

FIG.10.

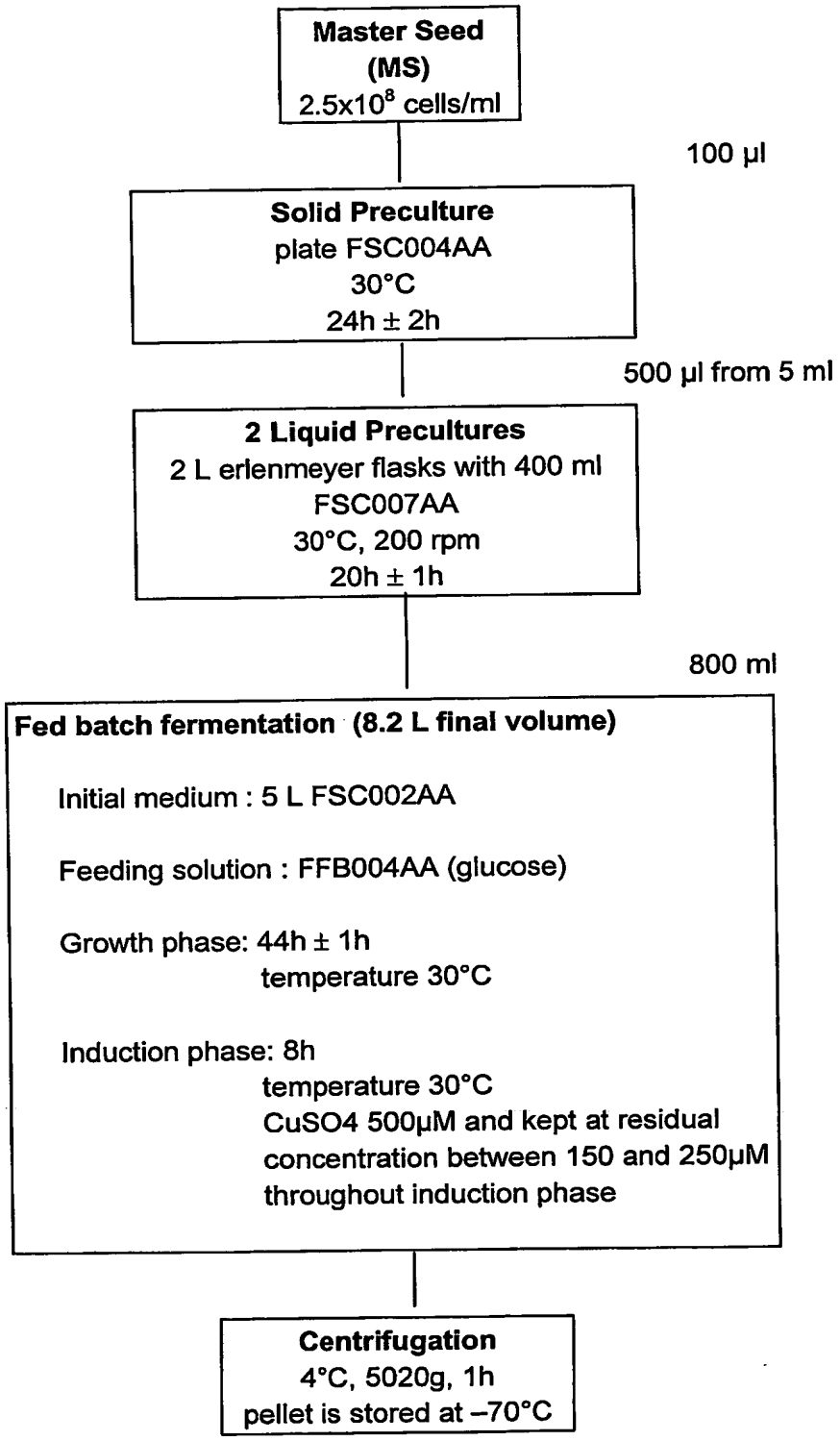
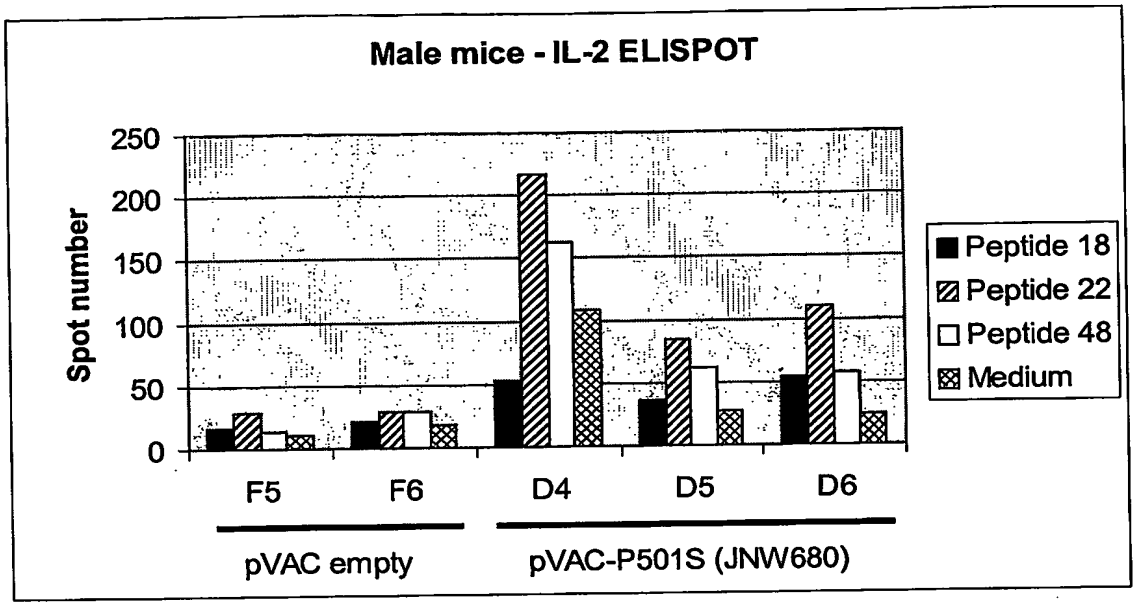

Master Seed
(MS)
2.5x10^8 cells/ml
100 µl
Solid Preculture
plate FSC004AA
30°C
24h ± 2h
500 µl from 5 ml
2 Liquid Precultures
2 L erlenmeyer flasks with 400 ml
FSC007AA
30°C, 200 rpm
20h ± 1h
800 ml
Fed batch fermentation (8.2 L final volume)
Initial medium : 5 L FSC002AA
Feeding solution : FFB004AA (glucose)
Growth phase: 44h ± 1h
temperature 30°C
Induction phase: 8h
temperature 30°C
CuSO4 500µM and kept at residual
concentration between 150 and 250µM
throughout induction phase
Centrifugation
4°C, 5020g, 1h
pellet is stored at –70°C

FIG.11.


Male mice - IL-2 ELISPOT
Spot number
250
200
150
100
50
0
F5
F6
D4
D5
D6
pVAC empty
pVAC-P501S (JNW680)
Peptide 18
Peptide 22
Peptide 48
Medium

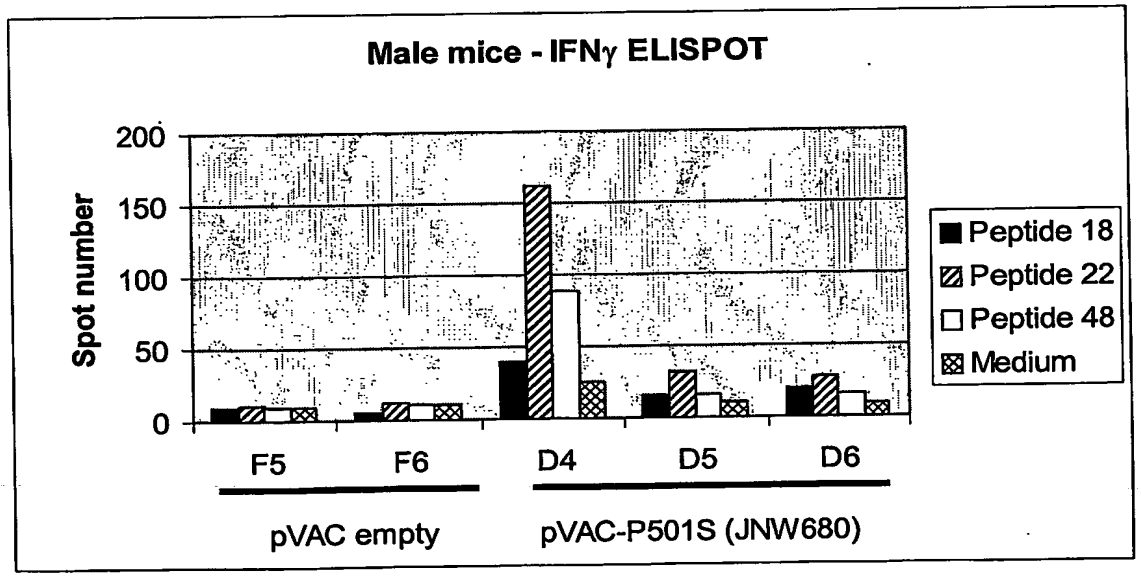
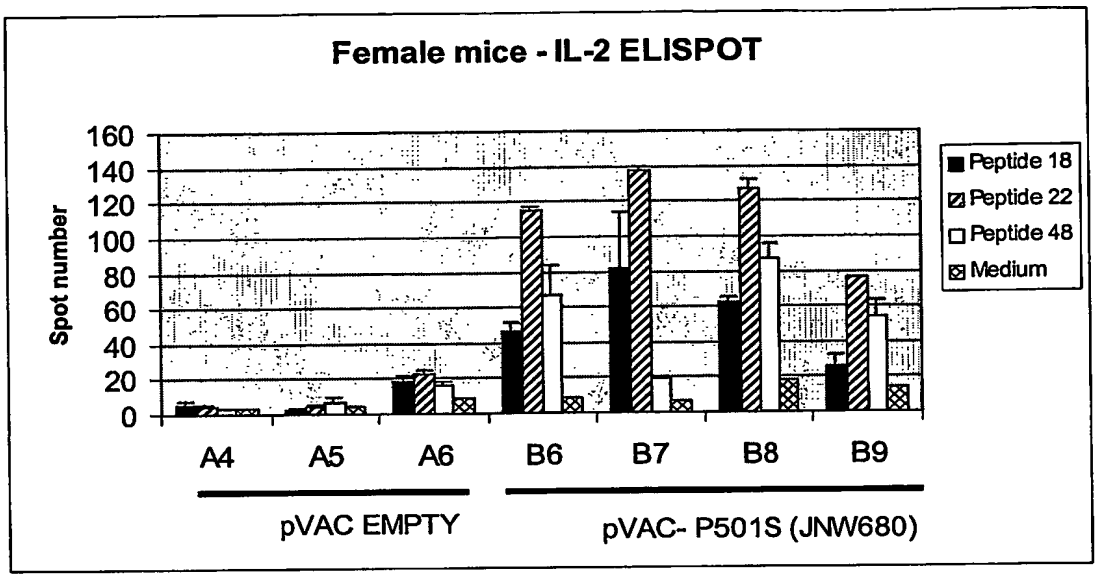

Male mice - IFNγ ELISPOT
Spot number
200
150
100
50
0
F5
F6
D4
D5
D6
pVAC empty
pVAC-P501S (JNW680)
Peptide 18
Peptide 22
Peptide 48
Medium

FIG.12.


Female mice - IL-2 ELISPOT
Spot number
160
140
120
100
80
60
40
20
0
A4
A5
A6
B6
B7
B8
B9
pVAC EMPTY
pVAC- P501S (JNW680)
Peptide 18
Peptide 22
Peptide 48
Medium

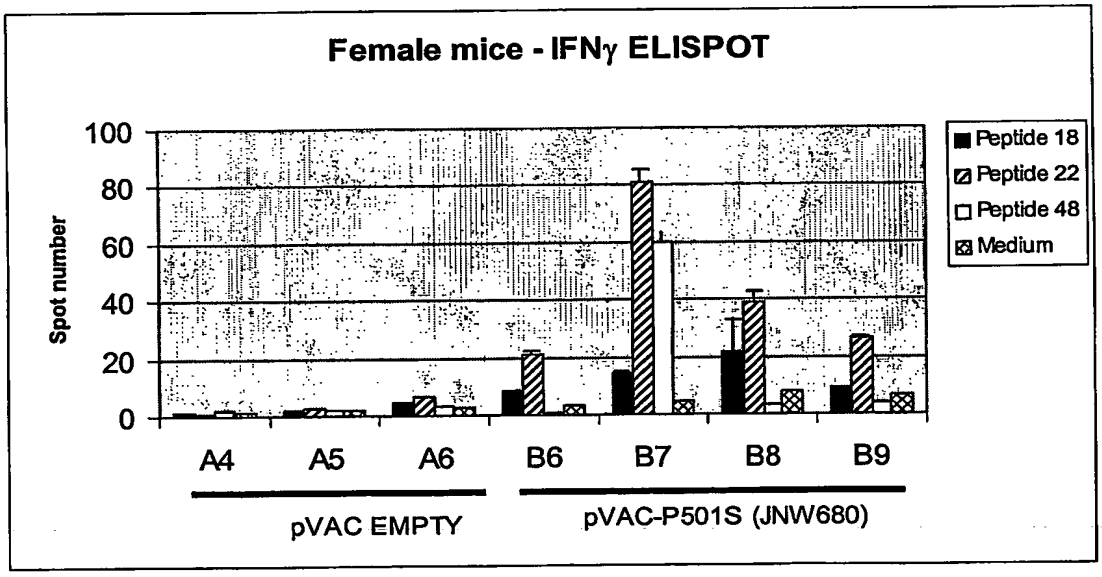

Female mice - IFNγ ELISPOT
Spot number
100
80
60
40
20
0
A4
A5
A6
B6
B7
B8
B9
pVAC EMPTY
pVAC-P501S (JNW680)
Peptide 18
Peptide 22
Peptide 48
Medium

FIG.13.

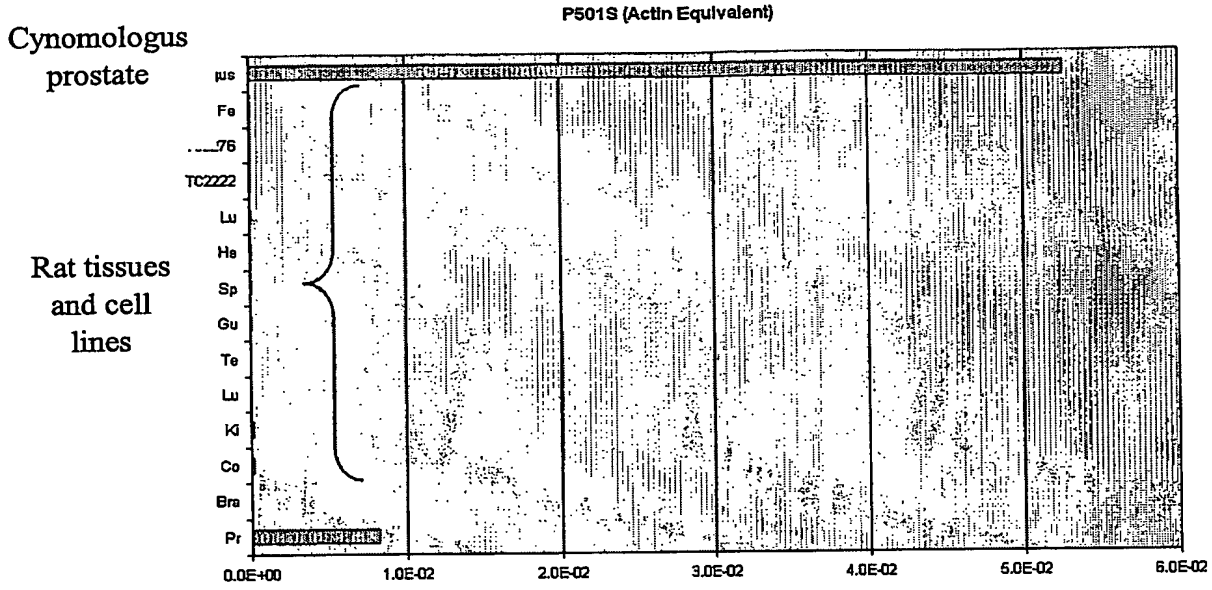


FIG. 14. Amino acid sequence for mouse P501S (SEQ ID N°10)

MIQRLWASRLLRHRKAQLLLVNLLTFGLEVCLAAGITYVPPLLLEVGVEEKFMTMVLGIGPVLGLVSVP
LLGSASDQWRGRYGRRRPFIWALSLGVLLSLFLIPRAGWLAGLLYPDTRPLELALLILGVGLLDFCGQV
CFTPLEALLSDLFRDPDHCRQAFSVYAFMISLGGCLGYLLPAIDWDTSVLAPYLGTQEECLFGLLTLIF
LICMAATLFVTEEAVLGPPEPAEGLLVSAVSRRCCPCHVGLAFRNLGTLFPRLQQLCCRMPRTLRRLFV
AELCSWMALMTFTLFYTDFVGEGLYQGVPRAEPGTEARRHYDEGIRMGSLGLFLQCAISLVFSLVMDRL
VQKFGTRSVYLASVMTFPVAAAATCLSHSVVVVTASAALTGFTFSALQILPYTLASLYHREKQVFLPKY
RGDAGGSSGEDSQTTSFLPGPKPGALFPNGHVGSGSSGILAPPPALCGASACDVSMRVVVGEPPEARVV
TGRGICLDLAILDSAFLLSQVAPSLFMGSIVQLSHSVTAYMVSAAGLGLVAIYFATQVVFDKNDLAKYS
V

FIG.15. DNA sequence for mouse P501S (SEQ ID N°11)

GAGATTTAAAAGGCGCCCGCTGGCGCGCGTTGGTGAMSCAGGBGTCGCCGAGCTCGCACGCGCCAGCCC
CAGGTGACAGCCGCACGCCGGGCCAGGATCTGACCGACGAGATGTGTCCCCATCAAGCAAGGCACTAGA
TGGTGACGTGTTTAGCGTGGGACGAGATGCTGAATTGGCACTAAAGGGCTGGCAGAAATGGGAACCTGG
CTGCACCCTAGGAGGTTAGTGCTAGTGAGGAGGAGAAGCCACGGCAGGGCTGACTCAAAGCAGCTGTGG
AGTATGTGAGTAGCCCCTGGAACCCTACCTGCCCTGTCCATCatgatccagaggctgtgggccagccgt
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gggggctgcctgggctacctcttacctgccattgactgggacaccagcgttctggccccctacctgggt
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GAGGGTCTGCCTCATGGGTTCTCAGCCCTTAGAGGGCTGCAGAGCTGGCCTCTCCAGGTCTTTGTCGCC
TAAGTGGCTCTCTGCTGCCACCCTAAGGCAGTGAGGTGTATTGTTGCACAGATAGGAGCCAGAGCTTTC
GGGGCTCTGGCTTCAGAGTCTGGCTGGCCTACTGGCAGCCTCTCGCATG

FIG.16.

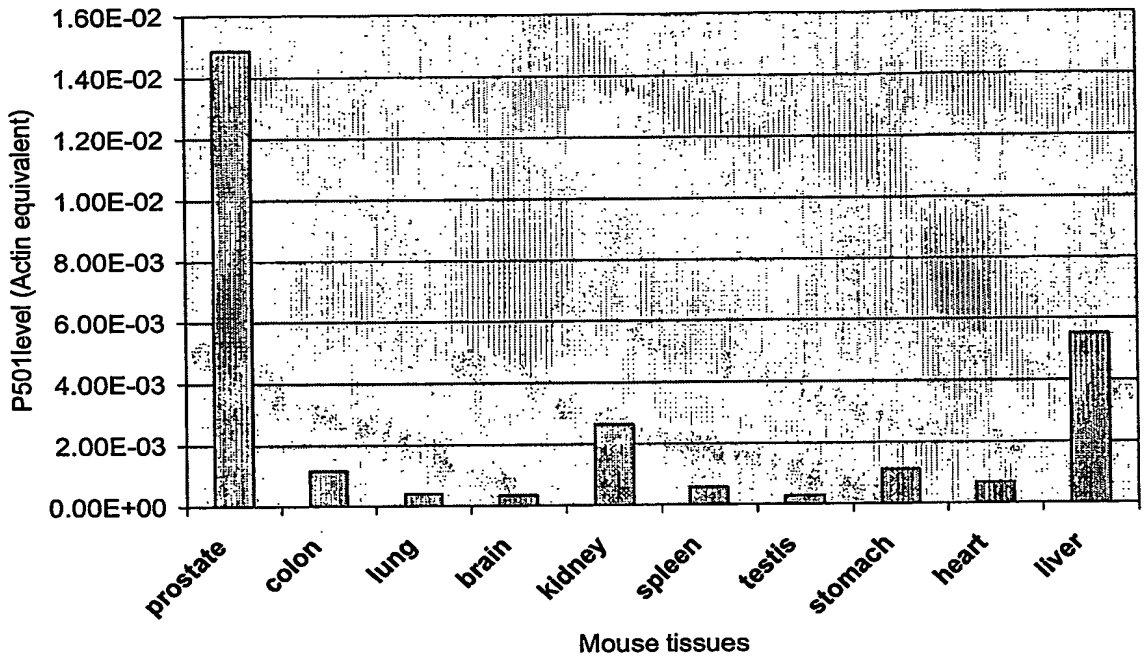
1.60E-02
1.40E-02
1.20E-02
1.00E-02
8.00E-03
6.00E-03
4.00E-03
2.00E-03
0.00E+00
P501level (Actin equivalent)
prostate
colon
lung
brain
kidney
spleen
testis
stomach
heart
liver
Mouse tissues

FIG.17.

P501S Western blot

Mouse P501S

Human P501S